IN THE CLAIMS:

1. (cancelled)

2. (previously presented) The system of claim 34, wherein said gravity gradiometer is a crossed dumbbell type gravity gradiometer.

3. (currently amended) The system of claim 34, wherein said coarse stage isolation mount has a first natural frequency and said first natural frequency exceeds said ~~second low pass cutoff~~ high frequency.

C1 Cont'd

4. (previously presented) The system of claim 34, wherein said coarse stage isolation mount controls displacement of said fine stage isolation mount relative to said aircraft.

5. (previously presented) The system of claim 4 including an aircraft, wherein said coarse stage isolation mount is mounted in said aircraft and wherein said aircraft includes a navigation system and a flight control system, said flight control system and said navigation system interacting to control a flight path of said aircraft, said flight control system operable by at least one of a human pilot and an autopilot system.

6. (cancelled)

7. (cancelled)

8. (previously presented) The system of claim 34 including:

an aircraft housing said gravity gradiometer, said coarse stage isolation mount, and said fine stage isolation mount.

9. (cancelled)

10. (previously presented) The system of claim 8, wherein said coarse stage isolation mount includes a control system for determining and controlling the position

of said fine stage isolation mount in at least one of three translational degrees of freedom.

11. (currently amended) The system of claim 10, wherein said coarse stage isolation mount includes a control system for determining and controlling said position of said fine stage isolation mount relative to said aircraft and consequently relative to a smoothed representation of a flight path of said aircraft.

C1 Cont'd

12. (previously presented) The system of claim 10, wherein said fine stage isolation mount includes a control system for determining and controlling the position of said gravity gradiometer in the six degrees of freedom associated with motion of a rigid body.

13. (previously presented) The system of claim 12, wherein said control system of said fine stage isolation mount directs said fine stage isolation mount towards a home position measured relative to the aircraft.

14. (cancelled)

15. (cancelled)

16. (cancelled)

17. (previously presented) The system of claim 34, wherein said fine stage isolation mount includes:

a base mounted on said coarse stage isolation mount;

a floater magnetically levitated relative to said base, said floater providing a mount for said gravity gradiometer;

a plurality of accelerometers adapted to measure said vibrations; and

a plurality of position sensors adapted to measure a relative position of said floater with respect to said base in the six degrees of freedom associated with motion of a rigid body.

18. (previously presented) The system of claim 17, wherein said accelerometers are at least one of linear accelerometers and rotational accelerometers.

C1 Cont'd

19. (cancelled)

20. (cancelled)

21. (currently amended) An apparatus for measuring gravity gradients comprising:

a gravity gradiometer;

a means for isolating low frequency, large amplitude displacements of the gradiometer ~~above a first low pass cutoff frequency~~; and

a means for ~~isolation,~~ isolating high frequency, small amplitude vibrations of the gradiometer ~~above a second low pass cutoff frequency~~, where said vibrations are characterized by a minimum frequency, said ~~second low pass cutoff~~ high frequency being greater than said ~~first~~ low ~~pass cutoff~~ frequency and less than said minimum frequency of said vibrations, and

wherein said means for isolating vibrations is mounted on said means for isolating displacements.

22. (previously presented) The apparatus of claim 21, wherein said means for isolating vibrations is a magnetically levitated isolation mount.

23. (currently amended) A method for obtaining fine resolution gravity gradient data comprising:

transporting a gravity gradiometer in an aircraft experiencing accelerations and displacements;

isolating, in a coarse stage, said accelerations and displacements above a first low ~~pass cutoff~~ frequency, large amplitude~~, said accelerations and displacements~~;

Isolating, in a fine stage, said accelerations and displacements above a second ~~low pass cutoff~~ high frequency, small amplitude, ~~said accelerations and displacements,~~ where said accelerations and displacements are characterized by a minimum frequency, where said second ~~low pass cutoff~~ frequency is greater than said first ~~low pass cutoff~~ frequency and less than said minimum frequency of said accelerations and displacements;

tracking a position of said aircraft in the six degrees of freedom associated with motion of a rigid body;

during said isolating of said accelerations and displacements in said coarse and fine stages, measuring gravity gradients using a gravity gradiometer; and

tabulating said gravity gradients as a function of said position of said aircraft.

24. (previously presented) The method of claim 23, wherein said tracking comprises:

identifying said position of said aircraft using at least one of an inertial navigation system and a global positioning system.

25. (previously presented) The method of claim 24, wherein isolating said accelerations and displacements in said fine stage comprises:

measuring accelerations of a floater magnetically levitated relative to a base using electromagnets;

measuring the position of said floater relative to said base; and

compensating for said accelerations through variable application of current through said electromagnets.

26. (previously presented) The method of claim 23, wherein isolating of said accelerations and displacements in said coarse stage comprises:

measuring accelerations of said fine stage,

measuring the position of said fine stage relative to the aircraft; and

counteracting said accelerations measured through application of counteracting force to the coarse stage.

C1 Cont'd

27. (previously presented) The method of claim 26, wherein isolating of said accelerations and displacements in said coarse stage includes:

determining said position of said fine stage relative to said aircraft;

applying forces to said fine stage responsive to said position determined so as to reposition said fine stage towards a home position in, and relative to, said aircraft.

28. (cancelled)

29. (cancelled)

30. (cancelled)

31. (currently amended) An aircraft generating data corresponding to gravity gradient measurements, said aircraft comprising:

a gravity gradiometer mounted in the aircraft;

a coarse stage isolation mount mounted in the aircraft adapted to attenuate~~,~~ ~~above a~~ first low ~~pass cutoff~~ frequency, large amplitude displacements of the gradiometer relative to a flight path ideal to the measurement of gravity gradient; and

a fine stage isolation mount mounted on said coarse stage isolation mount adapted to attenuate~~, above a~~ second ~~low pass cutoff~~ high frequency, small amplitude vibrations of said gradiometer relative to a flight path ideal to the measurement of gravity gradient, where said vibrations are characterized by a minimum frequency, said second ~~low pass cutoff~~ frequency being greater than said first ~~low pass cutoff~~ frequency and less than said minimum frequency of said vibrations.

C1 end

32. (cancelled)

33. (cancelled)

34. (currently amended) A gravity gradient measuring system for use in an aircraft comprising:

a gravity gradiometer for mounting in an aircraft;

a coarse stage isolation mount for mounting in an aircraft adapted to attenuate~~, above a~~ low ~~pass cutoff~~ frequency, large amplitude displacements of the gravity gradiometer relative to a flight path ideal to the measurement of gravity gradients; and

a fine stage isolation mount carried by said coarse stage isolation mount and supporting said gradiometer for attenuating~~, above a second low pass cutoff~~ high frequency, small amplitude vibrations of the gradiometer relative to an aircraft and consequently relative to a flight path ideal to the measurement of gravity gradients.